TITLE OF THE INVENTION

AUTOMATIC AUTHENTICATION METHOD AND SYSTEM

IN PRINT PROCESS

5 FIELD OF THE INVENTION

The present invention relates to a print control
method and system and, more particularly, to a print
control method and system which pertain to user
authentication in a print process by a printer.

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BACKGROUND OF THE INVENTION

A department management authentication system in
a print process by a conventional printer normally uses
the following method.

15   (1) When cost for expendables in a document
processes by a printer, cost for the use time of the
printer, and the like are managed for respective users
or departments such as affiliations and the like,
department authentication requires a user who executes

20 a print process to input a user ID and password in
advance at the beginning of the print process.

(2) Upon executing a document print process by
the printer, to do a secured print process that
requires security, a user is required to input his or

25 her user ID and password on the user interface of a
printer driver on a host system in advance and to again
input the same user ID and password on the control

panel of a printer at the beginning of the print process.

(3) It is a common practice to input the user ID and password for each print job.

5   For example, in Japanese Patent Laid-Open No. 10-207661, a user name, group name, and password are appended as a header of print instruction data which is sent to a printer. When the user sets "user name", "group name", and "password" (authentication

10   data) on a driver window, and instructs to start a print process from an application, the data is transferred to the printer, and a management system controller of the printer interprets the header to confirm the user name, group name, and password. The

15   controller compares a user name list of registered users who can use the printer, and the user name in the data to check if the user is authentic.

Recently, it is required to manage a using status of a printer in accordance to each of users or

20   departments. However, in the prior system, it is not possible to manage the using status in accordance to each of applications. For example, it is impossible to change a user or department when the user or department executes a print process via a specific application, or

25   to prohibit a user or department from executing a print process via a specific application.

Also, in the prior art, when user authentication is made in a print process by the printer, the following problems are posed.

(1) Since department authentication or user authentication is done by making each user who executes a print process input his or her user ID and password in advance and again at the beginning of the print process, the user ID or password is likely to be leaked to a third party.

(2) Since the user ID and password are input for each print job, complicated user authentication operation is required.

(3) It is impossible for an external authentication apparatus to recognize a name of application instructing an execute of a print process, which name is used for management or limitation of the print process, without complicated operation, when a user or department executes the print process using data formed via a specific application.

SUMMARY OF THE INVENTION

The present invention has been made in consideration of the above prior arts, and has as its object to provide an arrangement for a user authentication before start of print without complicated manual operation by user.

The present invention has as its another object to provide an arrangement for a charging or limiting of use process based on as used authentication using a name of application instructing an execute of a print process.

The present invention has as its further another object to provide an automatic authentication method and system in a print process which can obviate the need for user's ID and password input operations and can improve security by automatically making authentication based on print information embedded in a file or information of an application program independently of user's inputs.

For example, upon making accounting management for respective departments in association with print processes by a printer, in a print accounting process for cost for expendables in print processes and cost for the use time of the printer, user authentication is automatically done on the basis of various kinds of document attribute information including at least one of a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like from an application that creates and outputs a document, thus maintaining high security and improving operability upon authentication.

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For example, upon executing a secured print
process by a printer, information required for user
authentication is sent from a printer driver on the
basis of various kinds of document attribute

5   information including at least one of a document name,
application name, document creator or updater,
affiliation of the document creator or updater,
password, create/update date, and the like, which are
output from an application that issues a document print

10   instruction and are associated with a document to be
printed, and user authentication is automatically done,
thus maintaining high security, and improving
operability by obviating the need for user operations
associated with user authentication.

15   For example, upon making accounting management
for respective departments in association with print
processes by a printer, in a print accounting process
for cost for expendables in print processes and cost
for the use time of the printer, user authentication is

20   automatically done on the basis of various kinds of
application attribute information including at least
one of an application name, application user,
affiliation of the application user, password, use date,
and the like that pertain to an application which

25   creates and outputs a document, thus maintaining high
security and improving operability upon authentication.
In addition, calculation and accounting processes of

application and printer use states are made for respective departments such as personal users, groups, affiliations, and the like.

To solve the above problems, an automatic authentication method in a print process according to the present invention is an automatic authentication method in a print process that requires user authentication, comprising the steps of: extracting information related to an application and/or a document for the print process as attribute information; and executing user authentication based on the attribute information.

The attribute information contains various kinds of document attribute information including at least one of a document name, application name, document creator/updater, affiliation of the document creator/updater, password, create/update date, and the like, which are associated with a document print process. The method further comprises the step of executing, when user authentication has succeeded and a print process is executed, an accounting process of expendables and the like associated with the document print process for each user or each department of a group to which the user belongs. The attribute information contains various kinds of application attribute information including at least one of an application name, application user, affiliation of the

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application user, password, use date, and the like, which are associated with the application used. The method further comprises the step of executing, when user authentication has succeeded and a print process

5   is executed, an accounting process associated with use of the application for each user or each department of a group to which the user belongs. User authentication is executed by comparing an ID and password found based on the attribute information, and an ID and password

10   that a user inputs to a printer.

An automatic authentication system according to the present invention is an automatic authentication system in a print process that requires user authentication, comprising: means of extracting

15   information related to an application and/or a document for the print process as attribute information; and means of executing user authentication based on the attribute information.

The attribute information contains various kinds

20   of document attribute information including at least one of a document name, application name, document creator/updater, affiliation of the document creator/updater, password, create/update date, and the like, which are associated with a document print

25   process. The automatic authentication system comprises a client computer or print server which is installed with a printer driver, a server for managing a network,

and a printer for executing the print process, which are connected via a network, and the extraction means is included in the printer driver, and the user authentication means is included in the server. The system further comprises means of, when user authentication has succeeded and a print process is executed, executing an accounting process of expendables and the like associated with the document print process for each user or each department of a group to which the user belongs. The attribute information contains various kinds of application attribute information including at least one of an application name, application user, affiliation of the application user, password, use date, and the like, which are associated with the application used. The system further comprises means of, when user authentication has succeeded and a print process is executed, executing an accounting process associated with use of the application for each user or each department of a group to which the user belongs. The automatic authentication system comprises a client computer or print server which is installed with a printer driver, and a printer for executing the print process, which are connected via a network, and the extraction means is included in the printer driver, and the user authentication means is included in the printer. The user authentication means compares an ID

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and password found based on the attribute information, and an ID and password that a user inputs to a printer.

A printer driver according to the present invention is a printer driver in an automatic authentication system which executes a print process that requires user authentication, comprising: means of receiving information related to an application and/or a document as attribute information for the print process; means of extracting information required for user authentication from the attribute information; means of sending a user authentication request appended with the extracted information to a server via a network; and means of, when user authentication has succeeded, controlling a printer to execute the print process.

Also, a printer driver according to the present invention is a printer driver in an automatic authentication system which executes a print process that requires user authentication, comprising: means of receiving information related to an application and/or a document for the print process as attribute information; means of extracting information required for user authentication from the attribute information; and means of sending print information appended with the extracted information to a printer.

A server according to the present invention is a server in an automatic authentication system which

executes a print process that requires user
authentication, comprising: means of receiving
information, which is required for user authentication
and is extracted from attribute information related to

5   an application and/or a document for the print process,
from a printer driver via a network; means of checking
a user authentication result by comparing the extracted
information with user authentication information which
is registered in advance; and means of returning the

10 user authentication result to the printer driver via
the network.

The user authentication information which is
registered in advance contains related information of a
user and a department of a group to which the user

15 belongs, and the server further comprises means of,
when user authentication has succeeded and a print
process is executed, executing an accounting process of
expendables and the like associated with the document
print process for each user or each department of the

20 group to which the user belongs. The user
authentication information which is registered in
advance contains related information of a user and a
department of a group to which the user belongs, and
the server further comprises means of, when user

25 authentication has succeeded and a print process is
executed, executing an accounting process associated
with use of the application for each user or each

department of the group to which the user belongs. The

server further comprises: means of registering and

holding various kinds of attribute information of

departments, affiliations, individuals, print

5   accounting states, and the like associated with clients,

users, and groups who make a document print process;

and means of updating use states of a printer used in a

print process for respective departments, affiliations,

and individuals. The attribute information contains

10   various kinds of document attribute information

including at least one of a document name, application

name, document creator/updater, affiliation of the

document creator/updater, password, create/update date,

and the like, which are sent from a print server or

15   client and are associated with a document print process,

and the checking means comprises means of executing

department authentication of a user, group, affiliation,

or the like by comparing a document creator/updater,

affiliation of the document creator/updater, and

20   password registered in the server on the basis of the

various kinds of document attribute information. The

attribute information contains various kinds of

application attribute information including at least

one of an application name, application user,

25   affiliation of the application user, password, use date,

and the like, which are associated with the application

used, and the checking means comprises means of

granting permission of use of the application on the basis of the application attribute information.

A printer according to the present invention is a printer in an automatic authentication system which executes a print process that requires user authentication, comprising: means of receiving information, which is required for user authentication and is extracted from attribute information related to an application and/or a document for the print process, from a printer driver together with print information; means of inputting user authentication information; and means of executing user authentication on the basis of a comparison result of the information required for user authentication and the input information.

A storage medium according to the present invention is a storage medium which computer-readably stores a printer driver in an automatic authentication system which executes a print process that requires user authentication, the printer driver comprising: the step of receiving information related to an application and/or a document for the print process as attribute information; the step of extracting information required for user authentication from the attribute information; the step of sending a user authentication request appended with the extracted information to a server via a network; and the step of controlling, when

user authentication has succeeded, a printer to execute the print process.

Also, a storage medium according to the present invention is a storage medium which computer-readably stores a printer driver in an automatic authentication system which executes a print process that requires user authentication, the printer driver comprising: the step of receiving information related to an application and/or a document for the print process as attribute information; the step of extracting information required for user authentication from the attribute information; and the step of sending print information appended with the extracted information to a printer.

Furthermore, a storage medium according to the present invention is a storage medium which computer-readably stores a control program for controlling a printer in an automatic authentication system which executes a print process that requires user authentication, the control program comprising: the step of receiving information, which is required for user authentication and is extracted from attribute information related to an application and/or a document for the print process, from a printer driver together with print information; the step of inputting user authentication information; and the step of executing user authentication on the basis of a comparison result

of the information required for user authentication and the input information.

As described above, the object of the present invention is achieved under the condition of the system arrangement of a system which forms a communication network between a host system that serves as a server for managing clients and print server, which are connected via a line on the basis of a network communication protocol, and various programs and data, and host systems serving as clients including the print server, and a printer shared under the management of the print server.

Various kinds of document attribute information including at least one of a document name, application name, document creator/updater, affiliation of the document creator/updater, password, create/update date, and the like in a document create/output application on a client are sent to a printer control program on a print server or client via an application interface (API) upon a document print process.

Upon receiving such various kinds of document attribute information, a printer driver on the print server or client sends a user authentication request to the server on the basis of the received document attribute information prior to print control for outputting a document.

User authentication is done based on department information managed on the server, and the authentication result is sent to the print server or client. If authentication has succeeded, department

5   management process such as an accounting process or the like is executed.

On the other hand, the printer driver on the print server or client comprises an arrangement and processes for executing a print control process on the

10   basis of a document print instruction, and printing a target document from a target printer.

Upon receiving various kinds of document attribute information mentioned above via the API, the printer driver analyzes and generates information

15   required for user authentication in a secured print process, and sends that generated information to the printer together with a document print control command.

The printer comprises an arrangement and processes for making user authentication based on a

20   user ID or password input at its control panel, and printing a target document if authentication has succeeded.

Other features and advantages of the present invention will be apparent from the following

25   description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a diagram showing the basic arrangement of an automatic authentication system in a print process according to an embodiment of the present invention;

Fig. 2 is a block diagram showing the arrangement of a host system comprising a print server and client, and a printer connected to the host system, which are used in an embodiment of the present invention;

Fig. 3 is a block diagram showing the flow of data according to the first embodiment;

Fig. 4 is a flow chart showing a document attribute information acquisition process, user authentication request process, and print control process in a printer driver according to the first embodiment;

Fig. 5 is a flow chart showing the print control process in the printer driver in the embodiment of the present invention;

Fig. 6 is a flow chart showing a department management control process on a program memory of a server according to the first embodiment;

Fig. 7 is a flow chart showing a user authentication control process on the program memory of the server according to the first embodiment;

Fig. 8 shows an example of a user registration information database of the first embodiment;

Fig. 9 is a block diagram showing the flow of data according to the second embodiment;

Fig. 10 is a flow chart showing respective control processes in an application of the second embodiment;

Fig. 11 is a flow chart showing a user interface configuration/display process, various attribute setup processes, document attribute information acquisition process, document data input process, and print control process in a printer driver of the second embodiment;

Fig. 12 is a flow chart showing respective control processes on a program memory of a printer of the second embodiment;

Fig. 13 shows an example of user authentication information of the second embodiment;

Fig. 14 is a block diagram showing the flow of data to show an example of user authentication and accounting processes by an application according to the third embodiment; and

Fig. 15 is a flow chart showing respective control processes in a client/print server and server of the third embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will be described in detail hereinafter with reference to the accompanying drawings.

[First Embodiment]

5 <Outline of Operation Example in This Embodiment>

In this example, in a system constituted by a client connected to a server based on a network communication protocol, a host computer of a print server, and a printer connected to and shared by them,

10 a print instruction is issued from the client to a target printer to print.

In response to this instruction, a printer control program (printer driver) on the host computer receives various kinds of document attribute

15 information such as a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like via an application interface on the basis of a document print instruction from an

20 application on the host computer as a client, and issues a user authentication request to the server.

The server sends the user authentication result to the print server or client, enters a document print process, and executes an accounting control process as

25 an example of department management.

The printer driver which resides on a program memory of the host computer and is associated with the

printer controls a target printer to print a document on the basis of various kinds of attribute setup information for a print process and figure/text and image rendering data.

5 <Example of Arrangement of Automatic Authentication System in Print Process of This Embodiment>
(Example of System Arrangement)

Fig. 1 shows an example of the basic arrangement of a system common to embodiments of the present

10 invention.

In a system in which a server 100, at least one print server 101, clients 102 to 104 comprising workstations, personal computers, and the like, printers 105 to 108 are connected via a communication

15 line, a network is built to have the server 100 as a core on the basis of an operating system and communication protocol.

In this system, each of the workstations or personal computers 102 to 104 serving as clients issues

20 a print instruction of a document created and saved by an application program on each client to one of various printers 105 to 108 shared under the management of the print server 101, thus controlling that printer to print out the document.

25 At this time, the application program sends various kinds of document attribute information such as a document name, application name, document creator or

updater, affiliation of the document creator or updater, password, create/update date, and the like to a printer driver on a host system serving as the print server 101 or one of the clients 102 to 104 in response to the document print instruction via an application program interface (API).

The printer driver on the host system which serves as the print server 101 or one of the clients 102 to 104 receives various kinds of document attribute information via the API, and selects and sends required information on the basis of such various kinds of document attribute information so as to identify a department such as a user, group, affiliation, or the like that pertains to a person who executes a document print process, thus sending a user authentication request to the server 100.

API is provided between an application and a printer driver and may be as a part of OS functions. However, in the present invention, API for obtaining file attributes from applications is provided in the printer driver side. The printer driver calls the API to obtain an application name and the like from the application as attribute information.

A user authentication program on the server 100 executes an authentication process on the basis of the document attribute information received from the printer driver on the host system which serves as the

5   print server 101 or one of the clients 102 to 104, and sends the authentication result to the printer driver.

The printer driver on the print server 101 or one of the clients 102 to 104 receives the user authentication result from the server 100, and enters a

10   document print process if it is determined that the user is authentic. Then, the printer driver generates output attribute information which includes a paper size, paper type, the number of copies, color/monochrome print mode, and the like used in a

15   print control process on the basis of various print attribute setups input in a print instruction mode, and sends that information to the server 100 that executes a print accounting control process.

Furthermore, the printer driver on a program

20   memory of the host system which serves as the print server 101 or one of the clients 102 to 104 generates a print control command of a target printer on the basis of the print attribute setups, and controls the target printer to print out a requested document.

25   On the other hand, the server 100 executes an accounting process associated with that print process

on the basis of the output attribute information from one of the print server 101 and clients 102 to 104.

(Example of Connection Arrangement of Host System and Printer)

5   An example of the connection arrangement of the host system and printer of this embodiment will be explained below with reference to Fig. 2.

A host system 300 serving as one of the clients 102 to 104 or print server 101 comprises an input

10   device 301 such as a keyboard, mouse, or the like for making inputs to the system, a display 302 for displaying data, a disk 303 for inputting/outputting files, and a printer 312 connected to the host system 300. In this system, the host system 300 controls the

15   printer 312 to output a document on the basis of a print instruction from a printer control program which resides on a program memory (RAM) 306 in the host system 300 and executes print control for a document print process from a client to the printer.

20   The arrangement of the host system 300 will be described in detail below using Fig. 2.

Reference numeral 304 denotes a CPU for controlling the host system and input/output devices connected thereto, executing a series of processes such

25   as output control and the like and various programs in accordance with input instructions; and 305, a ROM that stores various basic programs such as a BIOS and the

like for operating the CPU 304. Reference numeral 306 denotes a RAM used as a work area for various processes on which the CPU 304 executes/runs various print attribute setups associated with the printer, overlay

5   print process, printer driver, and the like. Also, an operating system, information that pertains to an external document output process to the printer driver and printer 312, an application program used to input instructions, and to issue a print instruction, and the

10 like are allocated on this RAM.

Reference numeral 307 denotes a keyboard controller comprising an interface for the input device 301 such as a keyboard, mouse, or the like, which is connected to the host system 300, and is used to make

15 various external inputs; 308, a display controller comprising an interface for displaying data on the display 302; and 309, a disk controller comprising an input/output interface to the disk 303. Reference numeral 310 denotes an interface which comprises a

20 communication protocol used to connect the host system 300 and printer 312 and to make communications, and inputs/outputs data via a network line such as the Ethernet or the like. Reference numeral 311 denotes a CPU bus for connecting the respective building

25 components of the host system.

The arrangement of the printer 312 will be described in detail below.

Reference numeral 314 denotes a CPU for controlling various input/output devices connected to the printer, and executing a series of processes such as print control and programs such as a communication

5 control process and the like in accordance with input instructions; 315, a ROM that stores programs used to control the printer to execute a series of processes such as control processes of respective input/output devices, communication control process, print control

10 according to an input instruction, and the like, a control command interpretation process, and the like, various data, and so forth; and 316, a RAM used as a work area for the CPU 314 to execute various programs and processes. Reference numeral 317 denotes an

15 interface which comprises a communication protocol used to connect the host system 300 and printer 312 and to make communications, and inputs/outputs data via a network line such as the Ethernet or the like. Reference numeral 318 denotes a disk controller which

20 comprises an input/output interface with a disk 313 that stores various data and the like in the ROM 315; and 319, a video interface for outputting a given pattern, i.e., an engine control processor that comprises an input/output interface for exchanging data

25 and signals with a printer driving system (engine) 321. Reference numeral 320 denotes a CPU bus for connecting the respective building components of the printer.

<Example of Operation of Automatic Authentication
System in Print Process of This embodiment>
(Operation Example of System)

Fig. 3 is an example of the arrangement that
shows control processes and the flow of control in
respective building components of the network
constituted by the server, clients, and printers shown
in Fig. 1.

The user creates and saves a document using an
application 201 on one of the clients 102 to 104. In
this case, various kinds of document attribute
information such as a document name, application name,
document creator or updater, affiliation of the
document creator or updater, password, create/update
date, and the like are input manually by the user or
automatically by an application program process.

Also, using application 201, the user makes
various attribute setups for a print process to a
printer driver 202 on one of the clients 102 to 104 or
print server 101, and issues a document print
instruction.

At the same time, the application 201 sends
various kinds of document attribute information, which
are input upon creating/saving a document, to the
printer driver 202 via an application interface (API).
In this case, various kinds of document attribute

information are sent in the form of parameters or data mapped on a program memory using the API.

The printer driver 202 on one of the clients 102 to 104 or print server 101 extracts information required to authenticate the user who executes a document print process on the basis of the document attribute information sent from the application 201, and sends extracted document attribute information 206 to the server 100, thus sending a user authentication request to the server 100.

The server 100 executes a user authentication process 207 for checking if the requested document print process is permitted, by comparing the document attribute information 206 sent from the printer driver 202 on one of the clients 102 to 104 or print server 101 with user identification information registered in a user registration information database 208. The server 100 returns the authentication result of the user authentication process 207 to the printer driver 202 on one of the clients 102 to 104 or print server 101.

If it is determined based on the user authentication result sent from the server 100 that the user is authentic, i.e., the requested print process is permitted, the printer driver 202 on one of the clients 102 to 104 or print server 101 converts text, figure, and image rendering data to generate a printer print

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control command on the basis of a document print instruction which is sent from the application 201 and contains various print attribute setups, and sends the command to a printer 204 via a spooler 203 of the

5   operating system, thus outputting a document (205).

When a print accounting process as an example of department management in this embodiment is to be executed at the same time, the printer driver 202 on the host system which serves as one of the clients 102

10 to 104 or print server 101 appends expendable use states such as a paper size, the number of sheets including the number of copies, paper type, the presence/absence of use of staples, color/monochrome print mode, and the like used in the print process to

15 the document attribute information 206 on the basis of various print attribute setups for the document print process, and sends that information to the server 100.

A department management control process in a print process by the server 100 will be described below.

20 A logging process 209 for executing calculation and accounting processes of printer use states for respective departments such as personal users, groups, affiliations, and the like from a logging information database 210 that stores various kinds of information

25 about printer use states corresponding to resource information such as operating states, functions, expendables used, and the like of the printers 105 to

108, is executed on the basis of the document attribute information 206 sent from the printer driver 202, and the processing result is stored in a department management information database 211 to update its

5   contents.

In the print accounting process of this embodiment, information stored in the logging information database 210 includes unit cost information associated with expendable use states such as a paper

10 size, the number of sheets including the number of copies, paper type, the presence/absence of use of staples, color/monochrome print mode, and the like used in a document print process.

The logging process 209 executes an accounting

15 calculation process for respective departments such as personal users, groups, affiliations, and the like, who make a document print process, and undergo a print accounting process, and stores the processing result in the department management information database 211 as

20 an accounting result to update the contents of the database 211.

(Example of User Registration Information Database)

Fig. 8 shows a simple configuration example of the user registration information database 208. Fig. 8

25 exemplifies a case wherein applications that execute a print process, and documents to be printed are registered together with their print terms.

Respective departments 208a of a company point to tables 208b each of which stores pairs of the names (IDs) and passwords of persons who belong to the corresponding department. From each person, an application 208c that executes a print process, and a document 208d to be printed are registered together with its print term.

When such database is registered, an application name that issued an instruction of a print process, a document name to be printed out, and a valid term of that print process are confirmed, and a name, department, and the like of a person who can execute that print process are also confirmed, thus allowing user and department authentication processes of the print process.

Note that Fig. 8 shows the application name, document name, term, name, and department for the sake of simplicity. To attain securer, effective authentication, various kinds of document attribute information such as a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like, as described above, or a combination of some pieces of attribute information selected from them according to the feature of an organization may be used.

(Operation Example of Printer Driver)

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The control processes and operations of a printer control program (printer driver) on the RAM 306 in the host system 300 shown in Fig. 2 will be described in detail below.

5   The printer driver which resides on the RAM 306 and implements a document print process is launched in response to a document output instruction from a document create/edit/printout application program which also resides on the RAM 306.

10   The printer driver receives various kinds of document attribute information such as a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like from the

15   application 201, which also resides on the RAM 306, via the application interface (API).

The printer driver extracts information required to authenticate the user who executes a document print process on the basis of the document attribute

20   information sent from the application, and sends the extracted document attribute information to the server, thus sending a user authentication request.

The server executes a user authentication process, and outputs a user authentication result. If it is

25   determined based on the user authentication result that the user is authentic, i.e., that print process is

permitted, the printer driver starts a document print control process to be described below.

The document print control process in the printer driver will be described below.

5   The printer driver sends a control command for initializing the printer to execute print control of the printer in a printer initialization process on the basis of print attribute setup information of a document output instruction from the application.

10   The printer driver executes a series of processes such as an input data & information interpretation process for interpreting data, various kinds of setup information, and the like used to execute an input process of pattern data, size, rendering output start

15   position, and the like of figure/text and image data to be printed by the printer from the application program on the RAM 306, a rendering output form control process for determining a rendering output form of a document to be printed on the basis of setup parameters that

20   instruct the size, rendering output form, and the like, an output control command conversion process for converting and generating a printer control command of the printer 312 to print the determined document, and an output control command transmission control process

25   for sending the generated printout control command to the printer, thus outputting a document from the printer 312.

Furthermore, when a print accounting process as an example of department management of this embodiment is to be executed, accounting object information is generated, and is sent to the server that makes

5   accounting management.

A document output operation by a printout control process in a control program on the program memory (ROM) 315 in the printer 312 will be explained in detail below.

10   Printer configuration information of available functions and resources in a print process such as the paper size and type which are currently supported, the presence/absence of an option finisher having a staple function, and the like is sent to the printer driver on

15   the RAM 306 of the host system 300 via the Ethernet interface 317.

The control program receives a control command which is sent from the printer driver on the program memory (RAM) 306 in the host system 300 and instructs

20   to initialize the printer, and executes an initialization process.

Subsequently, the control program executes a series of processes including a print control command input process for inputting a printer print control

25   command sent from the host system so as to control the printer 312 to print, a control setup parameter interpretation process for interpreting the input

printer print control command, various setup parameters, and the like, and a bitmap rendering process for generating bitmap data on the basis of the print control command and control setup parameters, and

5   rasterizing the data on a bitmap memory, and sends the generated bitmap data to the printer driving system (engine) 321 via the video interface 319 that exchanges information with the engine control processor, thus outputting a document (322).

10 (Example of Control Processes in Print Server or Client)

Respective control processes of the printer control program (printer driver) on the RAM 306 of the host system 300 in this embodiment with the above

15 system arrangement will be described in detail below using the flow charts shown in Figs. 4 and 5.

Fig. 4 is a flow chart showing control processes executed until the printer driver on the host system 300 which serves as the print server 101 or one of the

20 clients 102 to 104 according to this embodiment outputs a requested document to the printer 312 via a document attribute information acquisition process from the application, a user authentication request process, a user interface configuration/display process, various

25 print attribute setups, a document data input process, and a print control process.

Step S401 is an input process of various kinds of document attribute information such as a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like, which are associated with a document in a document print process, from the application on the client. Parameters or data are input/output by calling an API function by the application or printer driver side.

Step S402 interprets the various kinds of input document attribute information to extract information required to issue a user authentication request to the server 100. The extracted document attribute information is sent to the server that executes a print accounting process in department management in step S403, thus sending a user authentication request.

Step S404 is an input process of the authentication result of the user authentication process from the server. Note that the user authentication request and authentication result are exchanged using, e.g., an application interface (API) which exchanges data and information between the user authentication control program on the server 100 and the printer driver on the print server 101 or one of the clients 102 to 104. More specifically, the user authentication request is sent to step S602 in Fig. 6

in step S403, and the authentication result is received from step S603 in Fig. 6 in step S404.

If it is determined in step S405 based on the authentication result that the document print process is permitted, the control starts the subsequent print execution process. On the other hand, if it is determined based on the authentication result that the document print process is denied, an error message is displayed in step S407, thus canceling the print process. In this case, the user interface of the driver may prompt the user to re-input a user ID and password to issue a user authentication request again.

Step S406 is a configuration/display control processor (module) of the user interface that allows the user to make various attribute setups in a print process. The target printer sends device configuration information such as available functions of a device, option devices attached, and the like, e.g., information which pertains to expendables including available paper sizes, paper types, staples of a staple finishing mode, toner/ink, and the like, and that which pertains to a print function including the total memory size, option devices attached such as a finishing device, and the like using two-way communication means with the host system. The available functions and option information based on such device configuration

information are reflected in various attribute setup
items on the user interface.

Step S408 is an input process of various
attribute setup data associated with a print process by
5 making setups on the user interface. Step S409 is an
input process of document data such as
text/figure/bitmap image and the like that form a
document to be printed from the application. The
various print attribute setup data (S408) and document
10 data (S409) are passed to a print control processor
(module) in step S410, thus executing a print control
process.

When a print accounting process as an example of
department management in this embodiment is to be
15 executed, accounting object information including use
states of expendables including a paper size, paper
type, the number of copies, consumed toner/ink amount,
staples, and the like used in the print process on the
basis of various print attribute setups analyzed by the
20 print processor in step S409, and is sent to the server
100.

Fig. 5 is a flow chart showing details of the
print control process by the printer driver on the
program memory (RAM) 306 in the host system 300 to
25 which the printer is connected in the print control
processor (module) in step S410 in Fig. 4. The printer
driver is launched in response to a print instruction

from an external program, e.g., a document input program such as a text/figure/image create/edit/print application or the like to a printer, and executes steps S501 to S512.

5   Step S501 is an input process of various print attribute setup parameters and text/figure/image data that form a document corresponding to the print instruction from the application. Step S502 interprets these input parameters and data. Step S503 converts

10   the setup parameters for the printer to generate a printer control command and sends the command to the printer to initialize it, so as to prepare for a print process including setups of the paper size, print direction, and rendering resolution, a unit setup of

15   the coordinate system, and the like on the basis of the input data interpretation result.

Steps S504 and S506 are processes for separating the interpreted parameters and data into text data, figure data, and image data. The text data, figure

20   data, and image data separated in steps S504 and S506 are respectively processed by a text print control processor (module), figure rendering control processor (module), and image rendering control processor (module) in steps S505, S607, and S508.

25   Based on the text print, figure rendering, and image rendering control process results in steps S505, S507, and S508, a document configuration control

process (module) in step S509 determines pattern output forms such as rendering output attributes, size calculations, rendering output positions, and the like, and lays them out on the output page of the printer.

5   The document output control data formed in step S509 is converted to generate a print control command of the printer by a print control command generation process (module) in step S510 so as to output the document to the printer. An output transmission process (module)

10   to the printer in step S511 sends the print control command generated in step S510 to the printer 312, thus controlling the printer to print out the document (S512).

(Example of Department Management Control Process in

15   Server)

        Respective control processes associated with department management in the server 100 of this embodiment with the above arrangement will be described in detail below using the flow charts shown in Figs. 6

20   and 7.

        Fig. 6 is a flow chart showing the control process on the department management server 100 in this embodiment.

        Step S601 is an information data input/output

25   control processor (module) that exchanges data and information using an application interface (API) which inputs/outputs data and information between the print

server 101 and clients 102 to 104 on the basis of the communication protocol.

Step S602 is a reception process of user identification information which is used to make user authentication and pertains to a document to be printed, and a user authentication request from the printer driver on the print server 101 or one of the clients 102 to 104 on the basis of the process in the information data input/output control processor. Step S603 is a user authentication process control processor (module) for executing an authentication process on the basis of the input user identification information and user authentication request. The authentication result in this process is similarly sent to the print server 101 or one of the clients 102 to 104 by the information data input/output control processor.

Step S604 searches the logging information database 210 for logging information associated with each object which is to undergo department management on the basis of logging object information which is sent and input from the printer driver on the print server or client on the basis of the process of the information data input/output control processor. Step S605 is a control processor (module) for executing a logging process on the basis of the department management information and logging information associated with each object which is to undergo

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department management. Based on the logging result

processed by the control processor (module) for

executing the logging process, information of the

logging result for each department such as a personal

user, group, affiliation, or the like is generated in

step S606. The logging result information generated

for each department such as a personal user, group,

affiliation, or the like is stored/saved in the

department management information database 211 in step

S607.

When a print accounting process as an example of

department management in this embodiment is to be

executed, step S604 searches the logging information

database 210 for logging information associated with

each object which is to undergo department management

as a cost information database for cost associated with

each accounting object using logging object information,

which is sent and input from the printer driver on the

print server or client based on the process of the

information data input/output control processor and is

used as accounting object information.

Step S604 searches the logging information

database 210 for logging information associated with

each object which is to undergo department management

using logging object information which is sent and

input from the printer driver on the print server or

client based on the process of the information data

input/output control processor. Step S605 is a control

processor (module) for executing an accounting

calculation process based on the accounting object

information and cost information associated with each

5   accounting object as a logging process controller

(module). Based on the accounting result calculated by

the control processor (module) that executes the

accounting calculation process, accounting result

information is generated for each user, group, or

10   department in step S606. The accounting result

information generated for each user, group, or

department is stored/saved in the accounting

information database 211 in step S607.

    Fig. 7 is a flow chart showing details of the

15   user authentication process in the user authentication

control processor (module) in step S603 in Fig. 6.

    Step S701 is an input process of various kinds of

document attribute information, which are used in user

identification required for user authentication of a

20   document to be printed, from the print server 101 or

one of the clients 102 to 104. Step S702 categorizes

the document attribute information into respective

components as identification information of the

document name, document creator or updater, or the like

25   used in user identification. Step S703 searches the

user registration database 208 shown in, e.g., Fig. 8

for the categorized user identification information.

Furthermore, step S704 compares the user identification information of the corresponding user who executes a document print process with the user registration information on the basis of the search result of the

5   user registration database.

If it is determined in step S705 that the user identification information matches the user registration information, an authentication result indicating that authentication has succeeded is sent to

10   the printer driver on the print server or client that issued the user authentication request in step S706. On the other hand, if it is determined in step S705 that the user identification information does not match the user registration information, an authentication

15   result indicating that authentication has failed is sent.

Therefore, according to this embodiment, the application on the host system which issues a document print instruction and serves as a client passes various

20   kinds of document attribute information, which are required for user authentication associated with a document to be printed, to the printer driver via the API, and the server that makes department management executes user authentication, thus providing an

25   automatic authentication system in department management of a printer that can achieve the object of the present invention.

[Modification of First Embodiment]

In this embodiment, a sending process of various kinds of document attribute information required for user authentication associated with a document to be printed, and a user authentication request, which are processed by the printer driver on the program memory (RAM) 306 of the host system 300, which serves as the print server 101 or one of the clients 102 to 104, in the first embodiment, may be implemented by a control process program on the program memory (ROM) 315 or (RAM) 316 in the printer 312. At this time, various kinds of document attribute information are sent to the printer after being converted into a print control command of the printer. Also, this process can be implemented by sending information from a printer having the function of the present invention, e.g., the high-speed, large-capacity printer 105 in Fig. 1 to the server 100 that makes department management using printer MIB or the like on the basis of a prescribed communication protocol.

[Another Modification of First Embodiment]

In this embodiment, in place of direct user's individual information such as a document creator/updater, affiliation, and the like arbitrarily or automatically input upon creating/updating a document in a document print process by the application, an application name, document name, or specific keyword

may be used in authentication process, thus

implementing a user authentication system of this

embodiment. In this embodiment, print accounting

management can be further diversified.

5   [Still Another Modification of First Embodiment]

        This embodiment uses a Centronics input/output

parallel interface, RS-232C or RS-424 input/output

serial interface, or SCSI interface in place of the

Ethernet interface that connects the host system and

10   printer shown in Fig. 2 so as to exchange data between

the printer driver on the program memory (RAM) 306 in

the host system and the printer 312 shown in Fig. 3.

        As described above, according to the first

embodiment, when use of printers associated with

15   document print processes is managed for respective

departments, the user who executes a print process can

be automatically authenticated without any manual

operations on the basis of various kinds of document

attribute information such as a document name,

20   application name, document creator or updater,

affiliation of the document creator or updater,

password, create/update date, and the like from an

application that issues a document print instruction,

thus implementing and providing an automatic user

25   authentication system in department management, which

can maintain high security and can improve operability

upon authentication.

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[Second Embodiment]

<Outline of Operation Example in This Embodiment>

In this embodiment, in a system constituted by a host system serving as a print server or client, and a printer, which are connected based on a network communication protocol, the client issues a document print instruction to a target printer.

Upon executing a document print process from an application on the host system, a printer control program (printer driver) on the host computer receives various kinds of document attribute information such as a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like, which are associated with a document, via an application interface, and sends user identification information used in user authentication to the printer on the basis of such attribute information.

The user inputs his or her user ID or password on the control panel of the printer, and a user authentication process for comparing the input user ID or password with the user identification information is done. If authentication has succeeded, the printer prints a target document.

<Example of Arrangement of Automatic Authentication System in Print Process of This Embodiment>

Since the system of this embodiment and an example of the connection arrangement between the host system and printer have already been explained with reference to Figs. 1 and 2 of the first embodiment, a detailed description thereof will be omitted.

<Example of Operation of Automatic Authentication System in Print Process of This embodiment>

(Operation Example of System)

Fig. 9 is an example of the arrangement that shows control processes and the flow of control in respective control programs on the host system and printer shown in Fig. 2.

The user creates a document (201a) using an application program 201' which resides on a RAM 106 of a host system 100. In this case, the user arbitrarily inputs various kinds of document attribute information 201b such as a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like, or the application program and operating system automatically generate and input the information 202.

The user also makes various attribute setups for a print process with respect to a printer driver 202' which also resides on the RAM 106 of the host system 100, and issues a document print instruction 201c. At the same time, the application sends various kinds of

document attribute information 201b mentioned above input upon creating the document to the printer driver 202' via an application interface (API). In this case, various kinds of document attribute information 201b are sent in the form of parameters or data mapped on a program memory using the API.

The printer driver 202' on the RAM 106 of the host system 100 converts text, figure, and image rendering data to generate a print control command of a printer 204 on the basis of the document print instruction 201c which is sent from the application and contains various print attribute setups. At the same time, the printer driver 202' extracts information required to authenticate the user who executes a document print process on the basis of the document attribute information 201b sent from the application, and converts the extracted information to generate a print control command of the printer 204. The printer driver 202' then sends the generated print control command to the printer 204 together with that generated for the document print process via a spooler 203 of the operating system.

Upon receiving the print control commands, the printer 204 stores/saves these commands in a RAM 116 in the printer or a storage device such as a hard disk 113 or the like as document print job data (212). The printer 204 displays a list of stored/saved print jobs

on the user interface of the control panel, and prompts
the user to select a job to be printed. At this time,
the user inputs his or her user ID or password on the
printer control panel to issue a user authentication
request. Furthermore, a control program on the printer
204 executes a user authentication process (207) by
comparing the information for user authentication,
which is contained in the print job data, and the input
user ID or password. If it is determined based on this
authentication result that authentication has succeeded,
i.e., the job is printable, a document is printed out
(205).

(Example of User Authentication Information)

Fig. 13 shows a simple example of user
authentication information used to generate an ID and
password from document attribute information.

Respective departments of a company point to
tables each of which contain the names of persons who
belong to the corresponding department. From each
person, an application name that executes a print
process is registered. An ID and password are
registered in correspondence with each combination of
the department, person name, and application name. In
Fig. 13, data created by applications AA, AB, and BD
executed by A in development section 1 are sent to the
printer while an identical ID and password are appended
to them.

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With such registration, user authentication of a print process can be done based on the department, name, application name, which issued a print process instruction.

5   Note that Fig. 13 shows the application name, name, and department for the sake of simplicity. To attain securer, effective authentication, various kinds of document attribute information such as a document name, application name, document creator or updater,

10   affiliation of the document creator or updater, create/update date, and the like, as described above, or a combination of some pieces of attribute information selected from them according to the feature of an organization may be used.

15   (Operation Example of Printer Driver)

The control processes and operations of a printer control program (printer driver) on the RAM 106 in the host system 100 will be described in detail below.

The printer driver which resides on the RAM 106

20   in the host system 100 and implements a document print process is launched in response to a document output instruction from a document create/edit/printout application program which also resides on the RAM 106.

The printer driver receives various kinds of

25   document attribute information such as a document name, application name, document creator or updater, affiliation of the document creator or updater,

password, create/update date, and the like from the application, which also resides on the RAM 106, via the application interface (API).

The printer driver extracts information required to authenticate the user who executes a document print process on the basis of the document attribute information sent from the application, converts the extracted information into a print control command of a printer 112, and sends the command to the printer 112.

A document print control process of the printer driver will be explained below.

The printer driver sends a control command for initializing the printer to execute print control of the printer in a printer initialization process on the basis of print attribute setup information of a document output instruction from the application.

The printer driver executes a series of processes such as an input data & information interpretation process for interpreting data, various kinds of setup information, and the like used to execute an input process of pattern data, size, rendering output start position, and the like of figure/text and image data to be printed by the printer from the application program on the RAM 106, a rendering output form control process for determining a rendering output form of a document to be printed on the basis of setup parameters that instruct the size, rendering output form, and the like,

an output control command conversion process for converting and generating a printer control command of the printer 112 to print the determined document, and a output control command transmission control process for sending the generated printout control command to the printer, thus outputting a document from the printer 112.

A document output operation by a print output control process in the control program on the ROM 115 and RAM 116 in the printer 112 will be described in detail below.

The control program receives a control command for initializing the printer, which is sent from the printer driver on the RAM 106 in the host system 100, and executes an initialization process.

Subsequently, the control program executes a series of processes including a print control command input process for inputting a printer print control command sent from the host system 100 so as to control the printer 112 to print, a control setup parameter interpretation process for interpreting the input printer print control command, various setup parameters, and the like, and a bitmap rendering process for generating bitmap data on the basis of the print control command and control setup parameters, and rasterizing the data on a bitmap memory, and sends the generated bitmap data to a printer driving system

(engine) 121 via a video interface 119 that exchanges

information with an engine control processor, thus

outputting a document (322).

(Example of Control Processes in Application)

5   Fig. 10 is a flow chart showing respective

control processes in the application program on the RAM

106 of the host system 100.

Step S901 executes various initialization

processes including an initialization process executing

10   upon launching the application program, and those based

on various attribute setups that pertain to document

creation. Step S902 is an input process of document

attribute information such as a document file name,

comment, affiliation of a document creator/updater,

15   password, and the like, and the document creator or

updater arbitrarily inputs such information. Step S903

is a document attribute information generation

processor (module) for inputting document attribute

information such as a document name, application name,

20   document creator or updater, create/update date, and

the like, which are associated with a document. Since

these pieces of attribute information input in this

step can be acquired from the application program and

operating system using a prescribed application

25   interface (API), they are automatically input. Step

S904 is a document create processor (module) for making

creation, edit, update, and the like of a document.

It is checked in step S905 if a document created, edited, or updated by the document create processor (module) S904 is to be printed. If the document is to be printed, various kinds of input/created document attribute information are sent to the printer driver on the RAM 106 of the host system 100 using an application interface (API) provided by the present invention in step S906 in an information data input/output processor (module) in step S907. On the other hand, if the document is not to be printed, this control process ends.

(Example of Control Processes in Printer Driver)

Respective control processes of the printer control program (printer driver) on the RAM 106 of the host system 100 in this embodiment will be described in detail below using the flow chart shown in Fig. 11.

Fig. 11 is a flow chart showing control processes executed until the printer driver on the host system 100 outputs a requested document to the printer 112 via a user interface configuration/display process, various print attribute setups, a document attribute information acquisition process from the application, a document data input process, and a print control process.

Step S1001 is a configuration/display control processor (module) of the user interface that allows the user to make various attribute setups in a print

process. Step S1002 is an input process of various attribute setup data associated with a print process by making setups on the user interface. Step S1003 is an information data input/output control processor

5 (module) for exchanging data and information using an application interface (API) that inputs/outputs data and information between the application and printer driver.

Step S1004 is an input process of various kinds

10 of document attribute information such as a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like, which are associated with a document in a document print process

15 from the application on the client on the basis of the process in the information data input/output control processor. Parameters or data are input/output by calling the API function by the application or printer driver side. Step S1005 interprets the various kinds

20 of input document attribute information to extract information required to make user for the printer 112. Step S1006 converts the interpreted/extracted attribute information to generate a print control command of the printer 112 or parameters of the print control command.

25 Step S1007 is an input process of print document data such as text/figure/bitmap image and the like that form a document to be printed from the application.

Various print attribute setup data (S1002) and document data (S1007) are passed to a print control processor (module) in step S1008 to execute a print control process.

5   Note that the flow chart which shows the print control process of the printer driver on the RAM 106 in the host system 100 to which the printer is connected in the print control processor (module) in step S1008 in Fig. 11 is the same as that in Fig. 5 of the first embodiment, and a detailed description thereof will be omitted.

(Example of Control Processes in Printer)

Respective control processes of the printer 112 of the second embodiment will be described in detail below using the flow chart shown in Fig. 12.

Step S1101 displays a list of print standby secure print jobs on the user interface of the control panel of the printer 112 on the basis of document print job data stored/saved in the program memory (RAM) 116 or a storage device such as the hard disk 113 or the like in the printer 112. Step S1102 prompts the user to select a job to be printed from those displayed in the list. At this time, the user inputs his or her user ID or password at the user interface on the printer control panel in step S1103 to issue a user authentication request. The input user ID or password is compared with information for user authentication

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contained in the print job data in step S1104, thus executing a user authentication process. If it is determined in step S1105 based on the authentication result that the input user ID or password matches the

5   information, i.e., if it is determined that authentication has succeeded and the job is printable, the control enters the subsequent print process. On the other hand, if the input user ID or password does not match the information, an error message is

10   displayed in step S1106 to prompt the user to re-input the user ID or password.

If it is determined in step S1105 that the job is printable, various print attribute setup data are input in step S1107. A print control processor (module) in

15   step S1108 executes an image output control process together with print job data, thus outputting a document (S1109).

Therefore, according to the second embodiment, the application on the host system that issues a

20   document print instruction passes various kinds of document attribute information required for authentication associated with a document to be printed via an API, and the printer executes user authentication before it prints a document, thus

25   providing an automatic authentication system in a secure print process of a printer, which can achieve the object of the present invention.

[Modification of Second Embodiment]

In this embodiment, in place of direct user's individual information such as a document creator/updater, affiliation, and the like arbitrarily or automatically input upon creating/updating a document in a document print process by the application, an application name, document name, or specific keyword may be used in authentication process, thus further setting an output priority order of standby document print jobs.

[Another Modification of Second Embodiment]

This embodiment uses a Centronics input/output parallel interface, RS-232C or RS-424 input/output serial interface, or SCSI interface in place of the Ethernet interface that connects the host system and printer shown in Fig. 2 so as to exchange data between the printer driver on the program memory (RAM) 106 in the host system 100 and the printer 112 shown in Fig. 1, thus also achieving the object of the present invention.

As described above, according to the second embodiment, when a secure print process is executed using a printer that executes a document print process, the user who executes a print process can be automatically authenticated without any manual operations on the basis of various kinds of document attribute information such as a document name, application name, document creator or updater,

affiliation of the document creator or updater, password, create/update date, and the like from an application that issues a document print instruction, thus implementing and providing an automatic user authentication system in department management, which can maintain high security and can improve operability upon authentication.

[Third Embodiment]

The third embodiment implements an authentication & accounting system upon using an application together with the first or second embodiment.

<Example of Arrangement of Automatic Authentication System in Print Process of This Embodiment>

Since the system of this embodiment and an example of the connection arrangement between the host system and printer have already been explained with reference to Figs. 1 and 2 of the first embodiment, a detailed description thereof will be omitted.

<Example of Operation of Automatic Authentication System in Print Process of This embodiment>

(Operation Example of System)

Fig. 14 is an example of the arrangement that shows control processes and the flow of control in respective building components of the network constituted by the server, clients, and printers shown in Fig. 1.

The user creates and saves a document using an
application 1400 on one of the clients 102 to 104. In
this case, various kinds of application attribute
information 1405 such as an application name,

5   application user, affiliation of the application user,
password, use date, and the like, which are associated
with the application used, are input by the user or
automatically on an application program process.

Also, using application 1400, the user makes

10 various attribute setups for a print process to a
printer driver 1401 on one of the clients 102 to 104 or
print server 101, and issues a document print
instruction.

At the same time, the application 1400 sends

15 various kinds of application attribute information,
which are input upon using the application, to the
printer driver 1401 via an application interface (API).
In this case, various kinds of application attribute
information are sent in the form of parameters or data

20 mapped on a program memory using the API.

Note that the printer driver 1401 can acquire the
application attribute information via an application
program interface (API) of the operating system. In
case of a dedicated application, when application

25 program interfaces (API) defined by the application
1400 and printer driver 1401 are prepared and used, the

printer driver 1401 can acquire the application
attribute information.

The printer driver 1401 on one of the clients 102
to 104 or print server 101 extracts information used to
5   authenticate the user who executes a document print
process, and the application name on the basis of the
application attribute information sent from the
application 1400, and sends extracted application
attribute information 1405 to the server 100, thus
10 issuing a user authentication request and application
use permission request to the server 100.

The server 100 executes a user authentication
process 1407 for comparing the application attribute
information 1405 sent from the printer driver 1401 on
15 one of the clients 102 to 104 or print server 101 with
user identification information registered in a user
registration information database 1406, and checking if
that user is granted the right of use of the
application of interest, i.e., the user is granted
20 permission of use of the application. The
authentication result of the user authentication
process 1407 is returned to the printer driver 1401 on
one of the clients 102 to 104 or print server 101.

If it is determined based on the user
25 authentication result sent from the server 100 that the
user can use the application of interest, the printer
1401 on one of the clients 102 to 104 or print server

101 converts text, figure, and image rendering data to generate a printer print control command on the basis of the document print instruction, which is sent from the application 1400 and contains various print attribute setups, and sends the command to the printer 1403 via a spooler 1403 of the operating system, thus outputting a document (1404).

At the same time, when an accounting process for use of the application is executed together with the print accounting process as an example of department management in this embodiment, the printer driver 1401 on the host system which serves as one of the clients 102 to 104 or print server 101 appends the use time upon using the application, the data size generated by the application, and the like to application attribute information 1405 on the basis of various application attribute setups upon using the application together with expendable use states for a print process, and sends the information to the server 100.

(Example of Accounting Process)

An accounting process as an example of department management in a print process by the server 100 will be explained below.

A logging/accounting process 1409 for executing calculation and accounting processes of application and printer use states for respective departments such as personal users, groups, affiliations, and the like from

a logging/cost information database 1408 that stores

various kinds of information such as cost corresponding

to an application use state, and various kinds of

information about printer use states corresponding to

5   resource information such as operating states,

functions, expendables used, and the like of the

printers 105 to 108, is executed on the basis of the

application attribute information 1405 sent from the

printer driver 1401, and the processing result is

10   stored in a department management information database

1410 to update its contents.

In the print accounting process of this

embodiment, information stored in the logging/cost

information database 1408 includes the use time upon

15   using the application, unit cost information such as a

document data size generated, and unit cost information

associated with expendable use states such as a paper

size, the number of sheets including the number of

copies, paper type, the presence/absence of use of

20   staples, color/monochrome print mode, and the like used

in a document print process. The logging/accounting

process 1409 executes an accounting calculation process

for respective departments such as personal users,

groups, affiliations, and the like, who use the

25   application to make a document print process, and

undergo an accounting process, and stores the

processing result in the department management

information database 1410 as an accounting result to
update the contents of the database 1410.

(Example of Control Processes in Client/Print Server
and Server)

5   Respective control process in the clients 102 to
104 or print server 101 and the server 100 in the third
embodiment will be described in detail below using the
flow chart shown in Fig. 15.

In step S1501, the printer driver 1401 acquires
10   the application name used via an application program
interface (API) of the operating system or by preparing
and using application program interfaces (API)
prescribed by the application 1400 and printer driver
1401 in case of a dedicated application.

15   In step S1502, the acquired application name is
input and sent to the server 100. It is checked in
step S1503 by the user authentication process 1407 on
the server 100 on the basis of the application use
right information of the user of interest if that user
20   can use the application. If it is determined that the
use cannot use the application, an error message is
displayed in step S1504, and the flow returns to step
S1501.

If it is determined that the user can use the
25   application, a user ID and password are input manually
by the user or automatically based on attribute
information of a document to be printed generated by

the application 1400, and are sent to the server in step S1506 as a user authentication request, so as to make user authentication on the server 100. The input user ID and password are compared with information used in user authentication contained in the print job data in step S1507, thus executing a user authentication process.

If it is determined based on the authentication result in step S1508 that the user ID and password match the information, i.e., if it is determined that authentication has succeeded and the job is printable, the control enters the subsequent authentication/accounting process and print process. On the other hand, if the user ID and password do not match the information, an error message is displayed in step S1509 to prompt the user to re-input a user ID or password.

If it is determined in step S1508 that the job is printable, calculation and accounting processes of application and printer use states for each department such as a personal user, group, affiliation, or the like are executed.

A print control processor (module) in step S1511 executes an image output control process to output a document (S1512).

As described above, according to the third embodiment, an accounting process of the use time of

the application, the document data size to be generated and printed, and the like is done for respective departments upon using an application by checking the right/permission of use of the application, thus

5   providing an automatic authentication system that can achieve the object of the present invention.

Note that the present invention is also achieved by supplying a storage medium, which records a program code of a software program that can implement the

10 functions of the above-mentioned embodiments to a system or apparatus, and reading out and executing the program code stored in the storage medium by a computer (or a CPU or MPU) of the system or apparatus.

In this case, the program code itself read out

15 from the storage medium implements the functions of the above-mentioned embodiments, and the storage medium which stores the program code constitutes the present invention.

As the storage medium for supplying the program

20 code, for example, a floppy disk, hard disk, optical disk, magneto-optical disk, CD-ROM, CD-R, magnetic tape, nonvolatile memory card, ROM, and the like may be used.

The functions of the above-mentioned embodiments may be implemented not only by executing the readout

25 program code by the computer but also by some or all of actual processing operations executed by an OS

(operating system) running on the computer on the basis of an instruction of the program code.

Furthermore, the functions of the above-mentioned embodiments may be implemented by some or all of actual processing operations executed by a CPU or the like arranged in a function extension board or a function extension unit, which is inserted in or connected to the computer, after the program code read out from the storage medium is written in a memory of the extension board or unit.

Note that the present invention can also be applied to a case wherein a program is delivered from a storage medium that records a program code of software which implements the functions of the above embodiments to the user who issued a request via a communication line such as personal computer communications.

According to the present invention, an automatic authentication method and system in a print process, which can obviate the need for user's input operations of the user ID and password and can improve security since authentication is automatically done based on print information embedded in a file or information from an application program without any user's input, can be provided.

That is, since authentication is automatically done based on file attributes, the user need not be troubled about authentication data and the like.

No password need be given to the user, and an authentication restriction can be set for the file itself. If a password is given to the user and is managed by himself or herself upon user authentication, it may be leaked to a third party. However, the present invention can solve this problem.

For example, upon making accounting management for respective departments in association with print processes by a printer, in a print accounting process for cost for expendables in print processes and cost for the use time of the printer, user authentication is automatically done on the basis of various kinds of document attribute information such as a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like from an application that creates and outputs a document, thus maintaining high security and improving operability upon authentication.

For example, upon executing a secured print process by a printer, information required for user authentication is sent from a printer driver on the basis of various kinds of document attribute information such as a document name, application name, document creator or updater, affiliation of the document creator or updater, password, create/update date, and the like, which are output from an

application that issues a document print instruction
and are associated with a document to be printed, and
user authentication is automatically done, thus
maintaining high security, and improving operability by

5 obviating the need for user operations associated with
user authentication.

For example, upon making accounting management
for respective departments in association with print
processes by a printer, in a print accounting process

10 for cost for expendables in print processes and cost
for the use time of the printer, user authentication is
automatically done on the basis of various kinds of
application attribute information such as an
application name, application user, affiliation of the

15 application user, password, use date, and the like that
pertain to an application which creates and outputs a
document, thus maintaining high security and improving
operability upon authentication. In addition,
calculation and accounting processes of application and

20 printer use states can be made for respective
departments such as personal users, groups,
affiliations, and the like.

As many apparently widely different embodiments
of the present invention can be made without departing

25 from the spirit and scope thereof, it is to be
understood that the invention is not limited to the

specific embodiments thereof except as defined in the appended claims.